Example 2

The following example illustrates the effectiveness of a hydrophobic finish material applied to a fibrous mat facing material in preventing the penetration of a cementitious slurry through the fibrous mat.

Talc powder (Talcron 40-26, particle size 5 microns) dispersed in water containing 0.05 wt. % tri-potassium polyphosphate (dispersant) at various solid loading levels and viscosities is applied to non-woven glass fiber mats to coat the mats at a thickness of 5 mil or 15 mil (based on wet film thickness). The solid loading level, viscosity, and thickness of the finishes are provided in Table 2. Finishes 5-7 also contain a hydroxyethylcellulose viscosity enhancer (0.05 wt. %). Finish 7 further includes 1 wt. % white wax. Thereafter, a cementitious slurry is deposited over the finish material.

TABLE 2

Finish	Thickness (mil)	Solids (%)	Viscosity (KU)	Results
1	5	50	70	Reduced slurry penetration
2	15	50	70	No slurry penetration
3	5	60	119	No slurry penetration
4	15	60	119	No slurry penetration
5	5	20	83	Reduced slurry penetration
6	15	20	83	Reduced slurry penetration
7	5	20	83	Reduced slurry penetration
8 (control)	(n/a)	(n/a)	(n/a)	High degree of slurry penetration

The amount of slurry penetration is visually inspected and compared to a control, which is provided by applying the same slurry to a glass fiber mat that is identical to the mats used to test finishes 1-7, but comprises no finish material.

By comparison to the control mat, a lesser amount of slurry will penetrate the mats comprising a finishing material, showing that the application of a hydrophobic finish to a fibrous mat facing material reduces or eliminates slurry penetration through the fibrous mat.

Example 3

The following example illustrates the preparation of a water-resistant cementitious article in accordance with the invention.

A cementitious slurry is prepared using the formulation provided in Table 1 in a board mixer. The siloxane component of the slurry is dispersed in water (e.g., 4.1-4.4 wt. % siloxane in water dispersion) using a 312/45 MS high shear mixer (20 hp, 3600 RPM) manufactured by Silverson Machines, Inc., East Longmeadow, Mass.), and introduced into the gauging water used to prepare the slurry. The siloxane dispersion is introduced into the board mixer in an amount sufficient to provide a final cementitious product comprising 11 lb. siloxane/msf board (about 0.43% wt./wt.). The slurry is used in conjunction with standard manufacturing processes to produce a paper-faced board product that passes the ASTM C1396/C 1396M-06 2-hour immersion target for sheathing without board defects of 10% and for water resistant gypsum backing board of 5% using ASTM Standard Test Method C 473.

A second cementitious slurry is prepared in the same manner, except that an X-Series High Shear Mixer ME-430XS-6 manufactured by Charles Ross & Son Company, Hauppauge, N.Y. instead of the Silverson mixer, and the siloxane dispersion is added to the board mixer in an amount sufficient to provide a final cementitious produce comprising 10 lb. siloxane/msf board (about 0.39% wt./wt.). The slurry is used in conjunction with standard manufacturing processes to produce a paper-faced board product that passes the C1396/C 1396M-06 2-hour immersion target for sheathing without board defects of 10% and for water resistant gypsum backing board of 5% using ASTM Standard Test Method C 473.

In order to produce a product that passes the ASTM C1396 standard using conventional processes, higher levels of siloxane typically are required (e.g., on the order of 12.5 lbs. siloxane/msf or about 0.5% wt./wt.). The foregoing example illustrates that preparing a water-resistant cementitious article in accordance with the invention can be advantageously be used with a lower siloxane loading level.

All references, including publications, patent applications, and patents, cited herein are hereby incorporated by reference to the same extent as if each reference were individually and specifically indicated to be incorporated by reference and were set forth in its entirety herein.

Preferred embodiments of this invention are described herein. Variations of those preferred embodiments may become apparent to those of ordinary skill in the art upon reading the foregoing description, without departing from the spirit and scope of the invention. Accordingly, this invention includes all modifications and equivalents of the subject matter recited in the claims appended hereto as permitted by applicable law. Moreover, any combination of the above-described elements in all possible variations thereof is encompassed by the invention unless otherwise indicated herein or otherwise clearly contradicted by context.

The invention claimed is:

1. A fibrous mat-faced cementitious article comprising:

(a) a cementitious core,

(b) a first fibrous mat comprising polymer or mineral fibers, the mat having at least a first surface facing the cementitious core,

(c) a hydrophobic film having a thickness of at least about 25 μm disposed on at least the first surface the mat, the film comprising talc, wax, a hydrophobic resin, a silicone-based compound, a fatty acid or salt thereof, polyethylene glycol, a hydrocarbon or fluorocarbon surfactant having 12 or more carbon atoms, or a combination thereof, wherein:

(i) the hydrophobic film is in contact with the cementitious core, and

(ii) the first fibrous mat bearing the hydrophobic film adheres to the cementitious core such that no greater than about 50% of the thickness of the first fibrous mat is embedded in the cementitious core.

2. The cementitious article of claim **1**, wherein polymer or mineral fibers are glass fibers, polyester fibers, or a combination thereof.

3. The cementitious article of claim **1** further comprising a second fibrous mat comprising polymer or mineral fibers, wherein the cementitious core is disposed between the first fibrous mat and the second fibrous mat.

4. The cementitious article of claim **1**, wherein the cementitious core is substantially free of mineral or paper fibers.

5. The cementitious article of claim **1**, wherein the cementitious core comprises a hydrophobic additive.

6. The cementitious article of claim **5**, wherein the hydrophobic additive is a silicone-based material.

7. The cementitious article of claim **1**, wherein the cementitious core comprises unstable and stable soaps.

8. The cementitious article of claim **1**, wherein the cementitious core comprises a polyphosphate.

9. The cementitious article of claim **8**, wherein the polyphosphate is sodium trimetaphosphate.